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ANALYSIS CENTER OF GEOPHYSICAL DATA OF IONOSPHERIC RESEARCH GROUP

M.L.R.O. Storey

The Ionospheric Research Group (G.R.I.) of C.N.R.S. has just opened /39* it's Analysis Center of geophysical data to the scientific public. This center, realized through the financial aid of CNES, was installed in 1964 in the new laboratory of G.R.I. at the Parc Saint-Maur Observatory. The objective of the Center is to answer all the needs of analysis which are not directly suited to treatment by a digital computer (excluding at all times the analysis of coded telemetry data). In general, these needs may be summarized as:

—— presentation in the form of oscillograms or sonic spectrograms of raw analogical data suitable for classification or preliminary analysis,

—— transformation of analogical data into numerical form for final analysis by computer,

—— presentation in graphic form, or other, of analyzed numerical data.

The initial conception of the Center revolved around the analysis of data recorded on magnetic tape; furthermore, it deals with providing a satisfactory means of treating photographic data. At present the laboratory equipment consists of the following apparatus, now in operation:

—— three registering devices--sound-pick-up units for the magnetic tape; two have 7 tracks and one 14 tracks, for reproduction and recopy of the data,

—— a rapid galvanometric oscillograph, with multiple tracks for the /40

*Numbers given in the margin indicate the pagination in the original foreign text.

presentation of data in the form of oscillograms,

—— two sonic spectrographs; one functioning continually (Spectran type), the other functioning discontinually (Sona-Graph type) for general data classification and for the measurement of the curve/time frequency of particular data which are presented in the form of signals on narrow band and at variable frequency (for example, atmospheric "whistling"),

—— an analogical numerical converter cable--7 channels, with outlets on the magnetic digital tape conforming to I.B.M. standards. This cable also contains a direct digital inlet which converts the continuous recordings of digital data to I.B.M. standards. The function of the converter is controlled by a small PDP-5 computer with 4,096 words of memory.

Last year, in the setting of this diverse G.R.I. research program, these apparatus were used mainly for the analysis of atmospheric soundings and variations of Earth's magnetic fields.

This year, installation of the following apparatus is planned:

—— a spectral force calculator,

—— a numerical analyzer of instantaneous phases of sinusoidal waves at variable frequency, use, for example, for measuring Doppler frequencies,

—— an analogical numerical converter which will synthesize any wave form, as the numerical data oscillograph,

—— a rapid curve tracer (18,000 deg./min. for continuous curves)--"step-by-step" type. To put the numerical data on the digital magnetic tape, the tracing is made on a role of graph paper (28 cm. x 36 m); tracing space is 0.1 mm.

—— a large cathode oscilloscope with numerical control (10 bits for each two /41 spot coordinates). This apparatus also gives a visual presentation of numerical data; an image may be photographed on a screen.

—— a "light-pen." This consists of a small accessory apparatus to the large oscilloscope which converts numerical forms of graphical and photographical data.

In all this apparatus, logical operation and unrolling of sequences is assured by a small PDP-5 computer already included in the conversion chain.

It is possible to predict the use of the curve tracer and large oscilloscope for control and visual presentation of data from the FR-1 satellite, to be launched late this year with the object of studying very low frequency radioelectric wave propagation in the low magnetosphere. This was planned in consideration of automatic data processing, with the greater part to be done by digital computer. Nevertheless, for convenient presentation of processed data, the Center would be needed.

Researchers from all groups envisioning any use whatever of these means, are invited to contact M. J. Moureton of G.R.I., the engineer (Groupe de Recherches Ionosphériques, Observatoire du Parc St-Maur, 4, avenue de Neptune, Saint-Maur-des-Fossés, Seine; Tél: 283 60-89). He will also be able to discuss the possibility of equiping the Center in 1966 with new ways to deal with needs which cannot yet be handled there.